$$u^3+x^3=2y^3,$$

which is proven in Legendre, *Théorie des Nombres*, p. 347, and in Euler's *Algebra*, Chap. XV, Part 2. He remarks that neither Euler nor Legendre have justified the use they make of the complex numbers $p+q\sqrt{-3}$. See also, *Crelle*, Vol. 27 (1844), p. 192.

PROBLEMS FOR SOLUTION.

ALGEBRA.

311. **Proposed by S. G. BARTON, Ph. D., Clarkson School of Technology, Potsdam, N. Y.**

Find, by Cardan's Method, the real root (4) of $x^3-6x^2+10x=8$.

312. **Proposed by J. A. CAPARO, C. E., Notre Dame University, Notre Dame, Ind.**

Two roots of the cubic $x^3-px^2+qx-c=0$ are equal. Find their value in terms of p, q, and c.

GEOMETRY.

342. **Proposed by G. I. HOPKINS, M. A., Instructor in Mathematics and Astronomy, Manchester, N. H.**

Given, circle DEF inscribed in triangle ABC and circumscribing the triangle DEF, D, E, F being the points of contact; AH is drawn through center, N, meeting chord DF in H. Through H is drawn BK meeting AC in K. Prove triangle ABK isosceles.

CALCULUS.

269. **Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.**

Prove that $\int_0^1 (x^a+x^{-a})\log\left(\frac{1+x}{1-x}\right)\frac{dx}{x}=\frac{\pi}{a}\tan(\tfrac{1}{2}\pi a)$.

270. **Proposed by S. A. COREY, Hiteman, Iowa.**

Prove that $\sum_{x=0}^{x=\infty}\frac{1}{(a^2+x^2)^n}=\frac{\pi}{2a^{2n-1}}\cdot\frac{1}{2}\cdot\frac{3}{4}\cdot\frac{5}{6}\cdots\frac{(2n-3)}{(2n-2)}+\frac{1}{2a^{2n}}$, n being a positive integer >1.

MECHANICS.

225. **Proposed by W. A. BALDWIN, Senior in Drury College, Springfield, Mo.**

Find, *by means of polar coordinates*, the moment of inertia about the origin of the area between the parabola $ay=2(a^2-x^2)$, the circle $x^2+y^2=a^2$, and the axis of Y.

226. **Proposed by W. J. GREENSTREET, M. A., Stroud, England.**

A frustum of a cone, vertical angle a, is cut off by two spheres whose centers are the vertex. The radius of one sphere is n times that of the other, and the density of the cone varies as the distance of the vertex. Find the ratio into which the centroid of the frustum divides the axis.